

WHAT IS CLAIMED IS:

1 1. Apparatus producing a self-regulating fluid bearing between a rotor
2 and stator, said apparatus comprising:
3 signal generating means for generating a signal representative of a pressure
4 change within a gap between opposing surfaces of said rotor and said
5 stator, said pressure change being one that is indicative of a
6 displacement of said rotor caused by a load imposed on said rotor;
7 a source of pressurized fluid;
8 a channel configured to convey fluid from said source of pressurized fluid to
9 said gap; and
10 fluid flow regulating means for regulating fluid flow through said channel in
11 response to said signal to reduce said displacement.

1 2. The apparatus of claim 1 wherein said signal is an electrical signal and
2 said signal generating means is a pressure transducer converting pressure to an electrical
3 signal representative of said pressure.

1 3. The apparatus of claim 1 wherein said signal is a fluid pressure level
2 detected within said gap.

1 4. The apparatus of claim 1 wherein said gap is defined as a first gap, said
2 signal generating means is defined as a first signal generating means, said channel is defined
3 as a first channel, and said apparatus further comprises:
4 second signal generating means for generating a signal representative of a
5 pressure change within a second gap between opposing surfaces of said
6 rotor and stator, said pressure change being one that is indicative of a
7 displacement of said rotor caused by a load imposed on said rotor, said
8 first and second gaps being on opposite sides of said rotor, and
9 a second channel configured to convey fluid from said source of pressurized
10 fluid to said second gap,
11 said fluid flow regulating means regulating fluid flow through said first and second channels
12 in response to said signals to reduce said displacements.

1 5. The apparatus of claim 4 wherein said first and second signals are
2 electrical signals and said first and second signal generating means are pressure transducers
3 each converting pressure to an electrical signal representative of said pressure.

1 6. The apparatus of claim 4 wherein said first and second signals are fluid
2 pressure levels detected within said first and second gaps respectively.

1 7. The apparatus of claim 4 wherein said rotor has an axis of rotation and
2 said first and second gaps are separated along said axis of rotation, said pressure changes
3 resulting from an axial force on said rotor.

1 8. The apparatus of claim 4 wherein said rotor has an axis of rotation and
2 said first and second gaps are separated along a line transverse to said axis of rotation, said
3 pressure changes resulting from a radial force on said rotor.

1 9. The apparatus of claim 4 wherein said first and second signals are first
2 and second fluid flows at flow rates that are representative of fluid pressures within said first
3 and second gaps respectively, and said fluid flow regulating means is a bistable fluidic
4 amplifier with individual inlets for said first and second fluid flows such that a net inflow
5 from said first fluid flow diverts pressurized fluid from said source of pressurized fluid to
6 said first channel and a net inflow from said second fluid flow diverts said pressurized fluid
7 to said second channel.

1 10. The apparatus of claim 4 wherein said first and second signals are first
2 and second fluid flows directly from said first and second gaps, and said fluid flow regulating
3 means is a bistable fluidic amplifier with individual inlets for said first and second fluid flows
4 such that a net inflow from said first gap diverts pressurized fluid from said source of
5 pressurized fluid to said first channel and a net inflow from said second gap diverts said
6 pressurized fluid to said second channel.

1 11. The apparatus of claim 10 wherein said rotor has an axis of rotation
2 and said first and second gaps are separated along said axis of rotation, said pressure changes
3 resulting from an axial forces on said rotor.

1 **12.** The apparatus of claim **10** wherein said rotor has an axis of rotation
2 and said first and second gaps are separated along a line transverse to said axis of rotation,
3 said pressure changes resulting from radial forces on said rotor.

1 **13.** The apparatus of claim **4** wherein said stator is a laminate of platelets,
2 said first and second channels reside in said stator and are defined by superimposed openings
3 in adjacent platelets.